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Resettlement Administration
Land Utilization Division
Land-Use Planning Section

Land-Use Planning Publication No. 7

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PRESENT LAND USE IN MORTON COUNTY, NORTH DAKOTA:

A Comparison of Mapping Methods

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By

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Washington, D. C.
November 1936

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A study of present land use in a township of Morton County, North Dakota was made during the summer of 1936, and maps were prepared to show acreage of grass and tilled land. (T.138 N., R. 89 W.) Previously, a map had been prepared showing present land use for the year 1933 from AAA data for the same township. Copies of the present land-use maps from each study are included herewith. (Land-Use Map 1933, and Land-Use Map 1936). When these maps are compared and considered with the statistics, it is evident that although wide differences in land use on individual farms or individual square miles are disclosed, the total discrepancies for the township are not very great. These differences may be due in part to inaccurate mapping on the AAA records, and in part to shifts in land use on individual farms between 1933 and 1936.

Assembly of Data

The assembly of material from the AAA data consisted of bringing together the separate maps of individual farms to make up the complete picture for the township for the year 1933. For the State of North Dakota as a whole, 96 percent of the farmers complied with the AAA program. While the data herein discussed do not show individual farms, only 18,239 acres were accounted for out of a total of 23,040 acres in the township. Thus, in this particular township, it is apparent that only about 80 percent of the land was included in the AAA program.

The survey of 1936 was carried on by the use of a plane-table with rather accurate measurement, so that there is little doubt as to the reliability, within narrow limits, of the latter survey.

In comparing the two maps, it is evident that data submitted by farmers indicate much more regularity in pattern of cropped and grassed areas than is shown by the plane-table survey. There are some wide discrepancies in acreages in individual cases although the difference in total acreage of tilled and grassed land, where the same areas are considered in both surveys, is not so great.

Table 1. Comparison of Present Land Use as Determined from AAA Records, (1933) and Plane-Table Survey of a Township (1936) in North Dakota

Section	AAA Data, 1933			Plane Table Survey 1936		Plane Table Survey: Adjusted to omit "No Data Acres" of AAA		Increase (+) or decrease (-) of Plane Table Survey from AAA Data	
	Tilled Acres	Native Grass Acres	No Data Acres	Tilled Acres	Native Grass Acres	Tilled Acres	Native Grass A.	Tilled Acres	%
1	148	172	320	325	315	165	155	+17	11
2	–	–	640	54	586	–	–	–	–
3	204	436	–	175	465	175	465	–29	14
4	312	328	–	335	305	335	305	+23	7
5	260	380	–	332	308	332	308	+72	28
6	485	155	–	480	160	480	160	– 5	1
7	110	280	250	170	470	70	320	–40	36
8	418	222	–	454	186	454	186	+36	9
9	344	136	160	420	220	420	60	+76	22
10	–	360	280	93	547	53	307	+53	
11	211	429	–	194	446	194	446	–17	8
12	320	320	–	231	409	231	409	–89	28
13	163	397	80	205	435	195	365	+32	20
14	96	384	160	104	536	104	376	+8	1
15	115	205	320	350	290	160	160	+45	39
16	–	–	640	–	640	–	–	–	–
17	492	68	80	595	45	515	45	+23	5
18	165	235	240	350	290	230	170	+65	40
19	138	182	320	258	382	85	235	–53	38
20	207	433	–	330	310	340	300	+133	64
21	290	270	80	340	300	330	230	+40	14
22	219	421	–	299	341	299	341	+80	37
23	160	480	–	198	442	198	442	+38	28
24	145	495	–	163	477	163	477	+18	12
25	346	294	–	226	414	226	414	–120	35
26	275	205	160	288	352	288	192	+13	5
27	329	311	–	428	212	428	212	+99	30
28	342	298	–	342	298	342	298	0	0
29	433	207	–	560	80	560	80	+127	29
30	230	410	–	276	364	276	364	+46	20
31	545	95	–	640	–	640	–	+95	17
32	230	250	160	283	357	198	282	–32	14
33	370	270	–	280	360	280	360	–90	24
34	299	181	160	478	162	328	152	+29	9
35	230	299	111	317	323	278	251	+48	21
36	–	–	640	–	640	–	–	–	–
Totals	8,631	9,608	4,801	10,573	12,467	9,372	8,867	+741	
	18,239		4,801			18,239			
	23,040			23,040					

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Totals	8,631	9,608	4,801	10,573	12,467	9,372	8,867	+741	
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	23,040			23,040					

For example, the cropped land under the AAA amounted to 8,631 acres, whereas the cropped land for corresponding areas shown by the plane-table survey amounted to 9,372 acres. The native grass land amounted to 9,608 acres under the AAA records, and under the plane-table survey of 1936 the grass land amounted to 8,867 acres. Thus it appears that altogether on the same farms there was an increase of 741 acres in crop land and a corresponding decrease in the amount of grass land from 1933 to 1936. This shift could easily have taken place in the actual farm practice. On the other hand, Table 1 shows that in Section 20 where there were 207 acres in crops in 1933 according to AAA data, there were 340 acres in 1936 according to the plane-table survey, or an increase of 64 percent. There were decreases in tilled acres in some sections, but the general tendency was toward an increase.

A similar plane-table survey was made in another township (T.138 N. R.90 W.) and Table 2 following shows the frequency of occurrence of differences between the AAA data and the plane-table survey for both townships above referred to:

Table 2. Frequency of Differences Per Square Mile in Land Use Between AAA Records of 1933 and Plane-Table Survey of the Same Areas for 1936

Percentage of change (increase or decrease) in tilled acres, 1933 to 1936	Frequency of Differences	
	T.138 N., R. 89 W.	T.138 N., R. 90 W.
0 - 10 %	9	21
11 - 25 %	11	10
26 - 50 %	11	3
Over 50 %	2	-

The frequency of occurrence of large differences is much less in the 34 square miles of the second township (T.138 N., R. 90 W.) than in the 33 square miles of the township first considered.

Detailed comparison of the maps above mentioned shows many discrepancies of a minute character. In some instances these discrepancies are purely matters of orientation. For example, a comparison of the square mile in the northwest corner of the township of the 1933 map and that of the 1936 survey shows that in all probability in fitting together material from the AAA records, this particular square mile was turned 90° from proper orientation.

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Comment On the Foregoing Analysis

By

Dr. C. P. Barnes
Land-Use Planning Section
Washington, D. C.

Comparison of land-use maps compiled from maps supplied by farmers on their wheat allotment contracts, with those made by plane-table survey, in this case shows rather large discrepancies as to detail of location and as to aggregate acreages within some sections, but substantial agreement as to the general pattern of land use within the township as well as within each quarter-township, and as to the total acreages of each use within the township.

Assuming these relationships to be typical of the Great Plains as a whole, we are justified in believing that maps compiled from farmers' sketches of the land-use layout of their farms will adequately meet the requirements of purposes in which only the general pattern of land use within each quarter-township need be known, but will be inadequate for purposes which require that the details of location or of acreage within a given farm be known.

Maps derived in this manner may be considered useful in relating crop yields and other records of crop experience to soil types or types of land, since the bodies of crop land and pasture, although not precisely represented as to size or shape, are nearly correct as to general position, which governs in considerable measure the validity of a relationship determined by comparing mapped areas of use with those of soil types or land types. In addition, maps of this sort, showing as they do the pattern of land use, are useful in helping to determine the boundaries of areas which are homogeneous as to pattern of land use.

Maps of land-use derived in this manner would not, however, be adequate for use in planning reorganizations of the use-patterns of individual farms, in the interest of, say, soil erosion control.

It is apparent from a comparison of the map compiled from farmers' sketches, with that made by plane-table survey that farmers are not, as a rule, able to sketch accurately the locations of their fields from memory. This, however, as has been shown above, does not necessarily render maps prepared in this manner invalid for certain useful purposes. Nevertheless, the limitations of usefulness to which such maps are subject should be realized.

Maps of land-use compiled from AAA contract records are very much less costly than maps of the same features prepared by field survey, unless recent aerial prints are available, for use in the field mapping. This favors the use of such maps, provided they serve the purpose for which land-use maps are needed.

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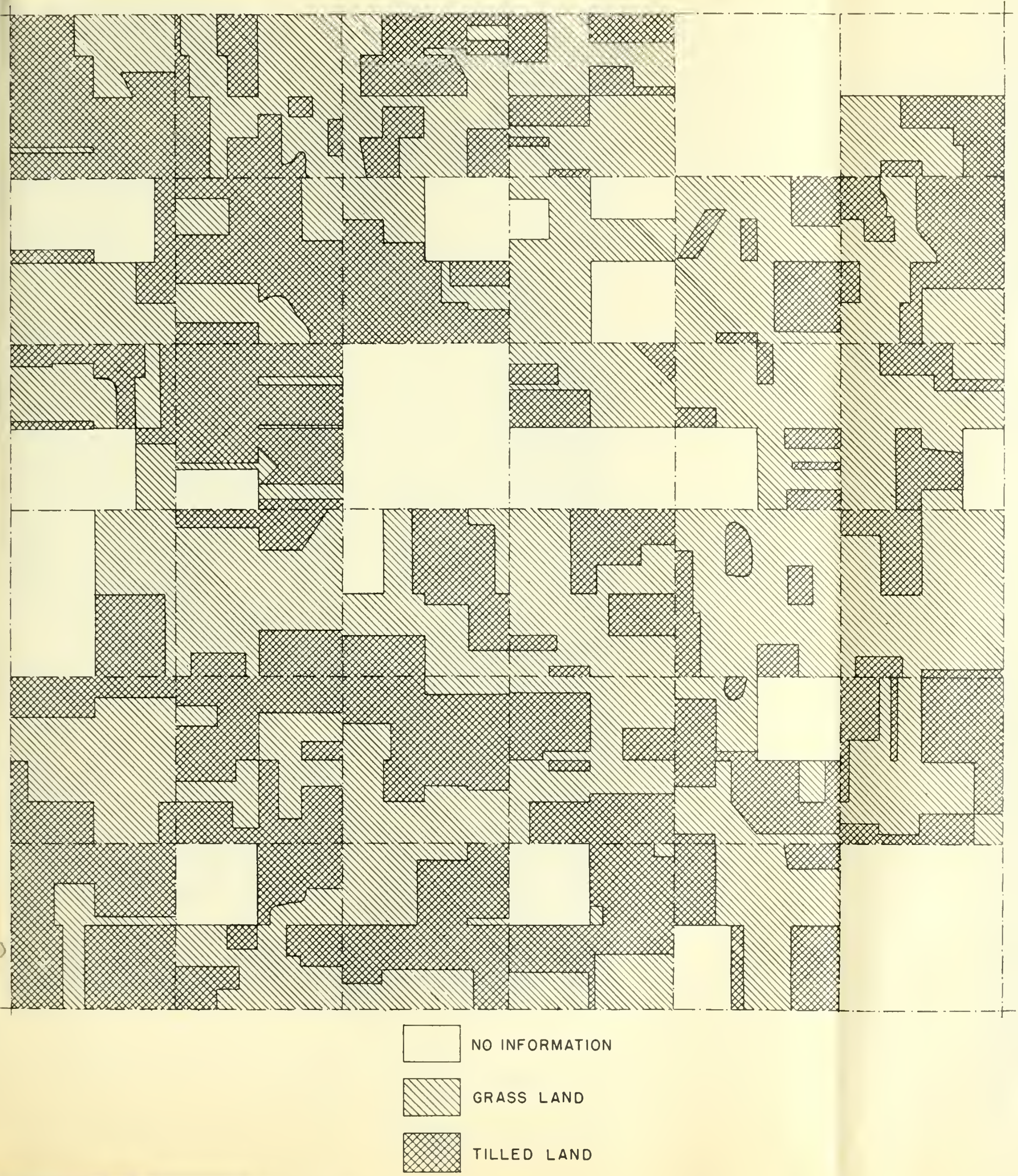
LAND-USE MAP MORTON COUNTY NORTH DAKOTA

T. 138 N - R. 89 W

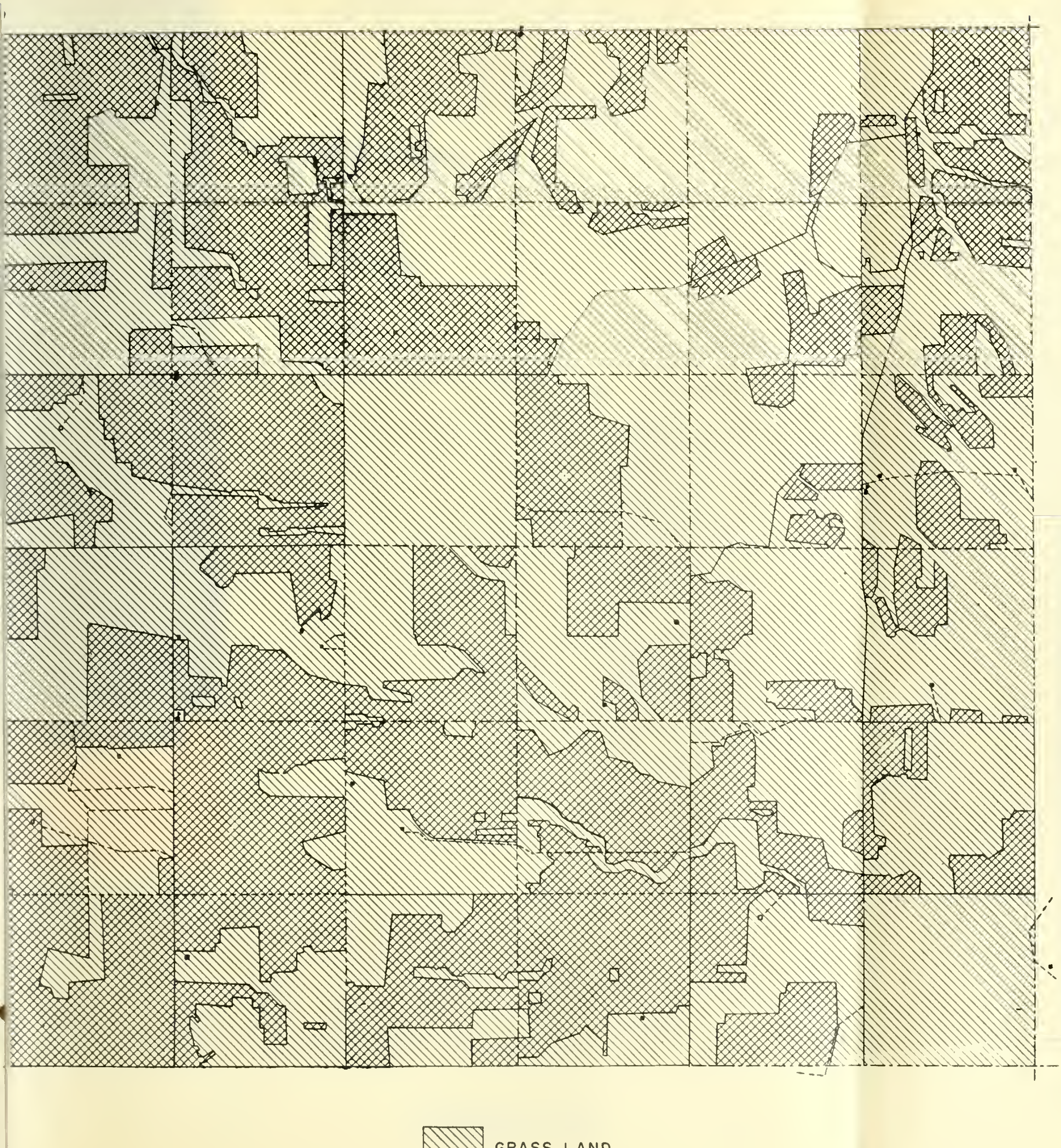
(DATA FROM 1933 AAA WHEAT ALLOTMENT APPLICATION MAPS)



LAND-USE MAP MORTON COUNTY NORTH DAKOTA

T. 138 N – R. 89 W

(DATA FROM 1936 LAND-USE PLANNING PLANE-TABLE SURVEY)



▧ GRASS LAND

▩ TILLED LAND